

REMARKS

In response to the Office Action dated August 17, 2010, Applicants respectfully request reconsideration. Each of the rejections set forth in the Office Action has been carefully considered and is addressed below. To further prosecution of the application, amendments have been made to the claims herein. The claims as presented are believed to be in condition for allowance.

I. Summary of Telephone Interview with Examiner

Applicants' representative appreciates the courtesies extended by Examiner Millikin in granting and conducting a telephone interview on October 12, 2010. Applicants were represented at the interview by Patent Agent Andrew Tibbetts (Reg. No. 65,139). The substance of the telephone interview is summarized herein.

During the telephone interview, Applicants' representative presented to the Examiner a general overview of subject matter described in the Specification that was commensurate in scope with the Discussion below. Applicants' representative and the Examiner also discussed proposals for amendments to some of the claims that would move the prosecution of the case forward toward allowance. During that discussion, the Examiner indicated that the amendments presented herein may overcome the rejections under §103 presented in the Office Action of August 17, 2010, but said that he may perform a new search. The amendments discussed with the Examiner are presented herein.

Further details of various topics discussed during the telephone interview with the Examiner are included in the remarks below.

II. Claim Rejections under 35 U.S.C. §103

Independent claims 2 and 12 were rejected under 35 U.S.C. §103(a) as allegedly being obvious over U.S. Patent No. 5,614,687 ("Yamada") in view of U.S. Patent No. 6,518,492 ("Herberger").

A. Discussion of Illustrative Embodiments From the Specification

Applicants' Specification discloses that conventional techniques for determining a tempo of sound involve: (1) acquiring audio data in a musical composition as time-series data, (2) calculating an auto-correlation of the audio data to detect peak positions in the audio data and acquire candidates for a tempo, and (3) analyzing the beat structure of the musical composition on the basis of the peak positions in the autocorrelation pattern and levels of the peaks to estimate the tempo of the musical composition (see, e.g., Applicants' Specification as filed, pp. 1-2). These steps for determining the auto-correlation and analyzing beat structure involve numerous complicated computational operations (p. 2). Many stereo systems (e.g., in-vehicle car stereo or home audio systems) are ill-equipped for performing these operations, as the load on the central processing unit (CPU) is too great (p. 2).

Some embodiments provide a technique whereby the tempo of an input sound signal, such as a musical composition, may be determined simply and accurately without performing the auto-correlation and beat structure analysis that places such a large processing load on the stereo's CPU (p. 3; p. 13). In these embodiments, a simpler analysis may be performed that includes identifying peaks in the audio signal and maintaining a count of time intervals between peaks (pp. 19-20). Peaks in the audio signal correspond to places in the audio where a sound level is above a threshold (pp. 19-20).

As many environments in which the technique will be used have limited resources (e.g., limited memory or processing power), in some cases a system may monitor an amount of data collected for each peak intervals (p. 26). If the system detects that a lot of data is being collected, then the system may dispose of some data to limit the amount of information to be stored and processed (p. 26). The system may dispose of data by subtracting a certain value from the counts or by discarding counts corresponding to peaks detected in the audio farthest in the past, among other techniques (p. 26).

The foregoing discussion is provided solely for the convenience of the Examiner in preparing to review the arguments below and is not intended to characterize any claim in any way. Each of the independent claims may not be limited in the manner described in the discussion above. In this respect, Applicants do not rely on the overview provided above to distinguish any of the

claims over the art of record. The Examiner is requested not to rely upon the discussion for determining whether each of the claims distinguishes over the art of record, but to do so based solely on the language of the claims themselves and the arguments presented below.

B. Yamada

Yamada discloses techniques for identifying a beats per minute (BPM) of songs such that songs with similar tempos can be identified (Yamada, col. 1, lines 10-56). In Yamada's system, two songs can be selected with similar tempos such that when a DJ is transitioning between two songs, the transition will appear smooth to listeners (col. 1, lines 10-56)

In Yamada's technique, the BPM of an input sound signal is determined by detecting an interval which begins when the sound signal first reaches a high level and ends when the sound signal again reaches the high level, and calculating the BPM based on the detected interval (col. 3, lines 57-63). In particular Yamada discloses that when a sound signal is received, a maximum value of the signal is detected, and a slice level equal to 75% of the maximum value is calculated as a threshold (col. 3, lines 23-29). Thereafter, the output of a band pass filter (BPF) is compared to the slice level and a start signal (called a "reset" signal) is generated when the output of the BPF exceeds the slice level (col. 3, lines 31-46). The system monitors the audio output from the BPF from the time the start signal is generated until the system determines that the BPF output again exceeds the threshold (col. 3, lines 58-62). The interval between the first and second time that the signal reaches the high level is used to calculate the BPM (FIG. 6D, T1; col. 3, lines 62-64).

C. Herberger

Herberger also fails to disclose or suggest accumulating a frequency of occurrence of each time interval between peak positions in a plurality of unit-time intervals. Herberger discloses a technique for determining the tempo of a musical work that allows for user participation in the BPM determination (Herberger, Abstract). Specifically, BPM estimates are determined using at least two different algorithms, producing a plurality of BPM candidates (Abstract). The user provides input to select the "best" BPM from among the candidates (Abstract).

D. Independent Claim 2 Patentably Distinguishes Over The Proposed Modification of Yamada Based On Herberger

Independent claim 2 has been amended herein. No system that would have resulted from the proposed modification of Yamada based on Herberger would have met the newly-added limitations of claim 2.

In particular, claim 2 has been amended herein to recite additional functionality of the identifying means of the tempo analyzing apparatus. Previously-pending claim 2 recited that the tempo analyzing means accumulates a frequency of occurrence of each time interval between the positions of peaks detected in a plurality of unit-time intervals and identifies the tempo of the sound to be reproduced with the input sound signal on the basis of a maximum one among all the accumulated frequencies of time interval occurrence. Claim 2, as amended herein, recites that “when the identifying means determines that a frequency of occurrence for a time interval exceeds a value, the identifying means reduces frequency of occurrence for at least one time interval.”

The Office Action does not contend that either Yamada or Herberger teaches or suggests these newly-added limitations of claim 2. In alleging that the proposed modification of Yamada based on Herberger would have met the limitations regarding the identifying means of previously-pending claim 2, the Office Action cites to passages of both Yamada and Herberger. Specifically, the Office Action cites to a passage of Yamada that describes that peak intervals can be identified and to a passage of Herberger that describes that a most-frequently-occurring beat interval could be identified as a tempo (Office Action, page 3, citing to the Abstract of Yamada of col. 8, lines 8-24, of Herberger). None of the passages of the references cited by the Office Action describe anything relating to *reducing* “frequencies of occurrences for at least one time interval” that had been accumulated. Rather, these passages of Yamada and Herberger only describe collecting new data and analyzing the collected data.

As neither Yamada nor Herberger teaches or suggests these limitations of claim 2, no system that would have resulted from the proposed modification of Yamada based on Herberger would have met these limitations of claim 2.

For at least these reasons, claim 2 patentably distinguishes over the proposed modification. Claims 3-6 and 8-10 depend from claim 2 and patentably distinguish for at least the same reasons. Withdrawal of the rejections of claims 2-6 and 8-10 under §103 is respectfully requested.

E. Independent Claim 12 Patentably Distinguishes Over The Proposed Modification of Yamada Based On Herberger

Independent claim 12 has been amended herein. No system that would have resulted from the proposed modification of Yamada based on Herberger would have met the newly-added limitations of claim 12.

For reasons that should be appreciated from the foregoing, no resulting system would have met the limitations of claim 12 regarding “when a frequency of occurrence for a time interval exceeds a value, reducing a frequency of occurrence for at least one time interval.”

For at least these reasons, claim 12 patentably distinguishes over the proposed modification. Claims 13, 16, and 18-20 depend from claim 12 and patentably distinguish for at least the same reasons. Withdrawal of the rejections of claims 12-13, 16, and 18-20 under §103 is respectfully requested.

III. General Comments on Dependent Claims

As each of the dependent claims depends from a base claim that is believed to be in condition for allowance, Applicants believe that arguing the allowability of each of the dependent claims individually is unnecessary at this time. Applicants do not, however, necessarily concur with the interpretation of the dependent claims as set forth in the Office Action. Applicants also do not concede that the basis for the rejection of any of the dependent claims is proper. Applicants reserve the right to specifically address in the future the patentability of the dependent claims not addressed herein.

CONCLUSION

A Notice of Allowance is respectfully requested. The Examiner is requested to call the undersigned at the telephone number listed below if this communication does not place the case in condition for allowance.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicant hereby requests any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, the Director is hereby authorized to charge any deficiency or credit any overpayment in the fees filed, asserted to be filed or which should have been filed herewith to our Deposit Account No. 23/2825, under Docket No. S1459.70086US00.

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Respectfully submitted,

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